

Axial Turbine Flowmeters for Liquid & Gas Services FA Series

DESCRIPTION & FEATURES

FA series flowmeters provide exceptionally reliable digital Outputs. These flowmeter are the solution for a variety of liquid and gas flow sensing applications.

Size: 1/2" to 12"

Flow Range Liquid: 0.03-15,000 GPM

Gas: 0.20– 15,000 ACFM

MATERIAL OF CONSTRUCTION

Housing: 316 SS

Internal wetted parts: 316SS

Rotor: 17-4PH or 430F SS

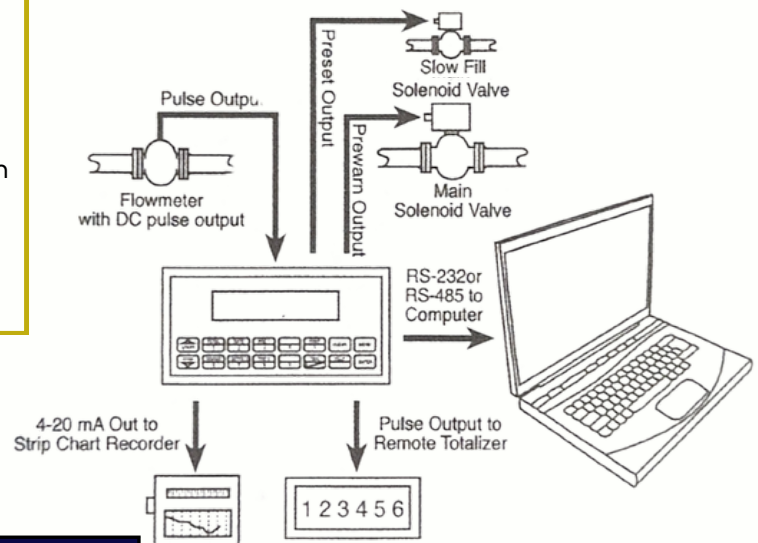
Ball Bearing: 440C SS or Hybrid

Ceramic

Pickoffs: Magnetic or RF

- Straight Run: 10D Upstream and 5D downstream
- Recommended filtration Ball Bearing: 10 to 100 micron
- Response Time : 3-4 ms Typical

Typical Flow Instrumentation System



SPECIFICATIONS

ACCURACY	LIQUID	GAS
Calibratim Traceable to NIST	±0.05% of Reading	±0.30% of Reading
Repeatability	±0.05% of Reading	±0.1% of Reading
Linearity w/. linearizing electronics	±0.1%	±0.1%
Temperature Range	-450 to 850°F	-450 to 300°F

Flow Range (Liquid)^① - Table I

Model Code	Nominal Size (inches)	Nominal Range (GPM)	Extended Range ^②			K-Factor Pulse/gallon	Max Hz Approx
			Mag Pickoff Min GPM	RF Pickoff Min GPM	Max GPM		
FA-4-8	1/2	0.25 – 2.50	0.10	0.03	3	48000	2000
FA-6-9		0.50 – 5	0.15	0.05	5	25000	
FA-8-8		0.75 – 7.50	0.20	0.08	8	16000	
FA-8		1 – 10	0.25	0.10	10	12000	
FA-10 ^③	5/8,3/4	1.25 – 12.50	0.30	0.15	15	9600	
FA-12	3/4	2 – 20	0.50	0.25	25	6000	
FA-16	1	5 – 50	1.00	0.60	60	2400	
FA-20	1-1/4	9 – 90	1.50	1.00	100	1200	1800
FA-24	1-1/2	15 – 150	2.50	1.60	160	600	1500
FA-32	2	20 – 250	3.50	2.50	250	300	1300
FA-40	2-1/2	40 – 450	5.00	5.00	500	160	1200
FA-48	3	40 – 650	7.50	7.50	750	75	800
FA-64	4	80 – 1250	15	15	1500	30	600
FA-96	6	250 – 3000	50	50	3500	8	400
FA-128	8	500 – 5500	60	60	6000	3	275
FA-160	10	800 – 8500	100	100	10000	2.5	225
FA-192	12	1000 – 12000	150	150	15000	1	200

Flow Range (Gas)^④ - Table II

Model Code	Nominal Size (inches)	Nominal Range w/. Mag Pickoff (GPM)	Extended Range w/. RF Pickoff ^② ACFM	K-Factor Pulse/gallon	Max Hz Approx
FA-4-8	1/2	0.25 - 2.50	0.20 - 3	48000	2000
FA-6-9		0.50 - 5	0.25 - 5	25000	
FA-8-8		0.75 - 7.50	0.40 - 8	16000	
FA-8		1 - 10	0.5 - 10	12000	
FA-10 ^③	5/8, 3/4	1.25 - 12.50	0.6 - 15	96000	
FA-12	3/4	2 - 20	1 - 25	6000	
FA-16	1	5 - 50	1.50 - 60	2400	
FA-20	1-1/4	9 - 90	2 - 100	1200	1800
FA-24	1-1/2	15 - 150	3 - 160	600	1500
FA-32	2	20 - 250	5 - 250	300	1300
FA-40	2-1/2	30 - 450	10 - 500	160	1200
FA-48	3	40 - 650	15 - 750	75	800
FA-64	4	80 - 1250	20 - 1500	30	600
FA-96	6	250 - 3000	75 - 500	8	400
FA-128	8	500 - 5500	150 - 6000	3	275
FA-160	10	800 - 8500	200 - 10000	2.5	225
FA-192	12	1000 - 12000	250 - 15000	1	200

① Data is based on water @ 70 °F & 14.7PSIA

② Require pre-amplifier/Signal conditioner

③ AN/MS 5/8" & NPT 3/4"

④ Data is based on air @ 70 °F & 14.7 PSIA

⑤ Refer Table III & Figure- C for dimensions

Part Numbering System

Refer Table I or II

TW 10 point in Water
TA 10 point in Air
TS 10 point in Solvent
TB 10 point in Oil Blend ^⑤
XW 20 point in Water
XA 20 point in Air
XS 20 point in Solvent
XB 20 point in Oil Blend ^⑤
U2 10 points each with min & max Viscosity ^⑤
U3 10 points each with min , Normal & max Viscosity ^⑤
BW Bi-directional in Water
BS Bi-directional in Solvent
BB Bi-directional in Oil blend ^⑤

RF Modulated Carrier

R1 2-pin MS connector, 250°F
R2 2-wire, flying leads, 250°F
R3 2-pin MS connector, 750°F
R4 2 Wire, Flying Leads 750°F
R5 CSA Explosion Proof, 250°F (2-wire)
R6 RTD, MS Connector, (4 pin)°F
R7 RTD, flying leads, 250°F (4 wire)
R8 RTD, MS Connector, 750°F (4 pin)
R9 RTD, flying leads, 750°F (4 wire)
R10 Intrinsically Safe, MS connector (2 pin)
R11 Intrinsically Safe, flying leads, (2 wire)
R12 3 pin MS connector, digital output 250 °F
R13 3-wire, digital output 250 °F
R14 3-Pin, intrinsically safe, digital output
R15 3-wire, intrinsically safe, digital output

P-1/4" SAE port with. 7/16-20 UNF thread
N-1/4" FNPT

Model Code

Process Connection

Calibration

Bearing

Pickoff

Pressure Tap*

M MS External Thread, 1/2" to 2", 37° Flare
N NPT External Thread, 1/2" to 6"
SA Tri-Clamp (Sanitary), 1/2" to 2"
HB Hose Barb 1/2" to 2"
F1 150#, ANSI RF Flange
F2 300#
F3 600#
F4 900#
F5 1500#
F6 2500#
C61 SAE Code 61
C62 SAE Code 62

} Available only on 6" to 2")
 } Available only on 1/2" to 2")

B Ball Bearing 440C
C Ball Bearing Hybrid Ceramic
D Tungsten Carbide Sleeve/Journal
E Ceramic Sleeve/Journal

Magnetic

M1 2-pin MS Connector, 300°F
M2 2-wire, flying leads, 300°F
M3 2-pin MS Connector, 750°F max
M4 2-wire, flying leads, 750°F max
M5 CSA Explosion Proof, 300°F (2 wire)
M6 RTD MS Connector 300°F (4 pin)
M7 RTD flying leads 300°F (4 pin)
M8 RTD MS Connector 750°F (4 pin)
M9 RTD flying leads 750°F max (4 wire)
M10 Intrinsically Safe, MS connector, (2 pin)
M11 Intrinsically Safe, flying leads, (2 wire)

⑤ The fluid viscosity must be provided

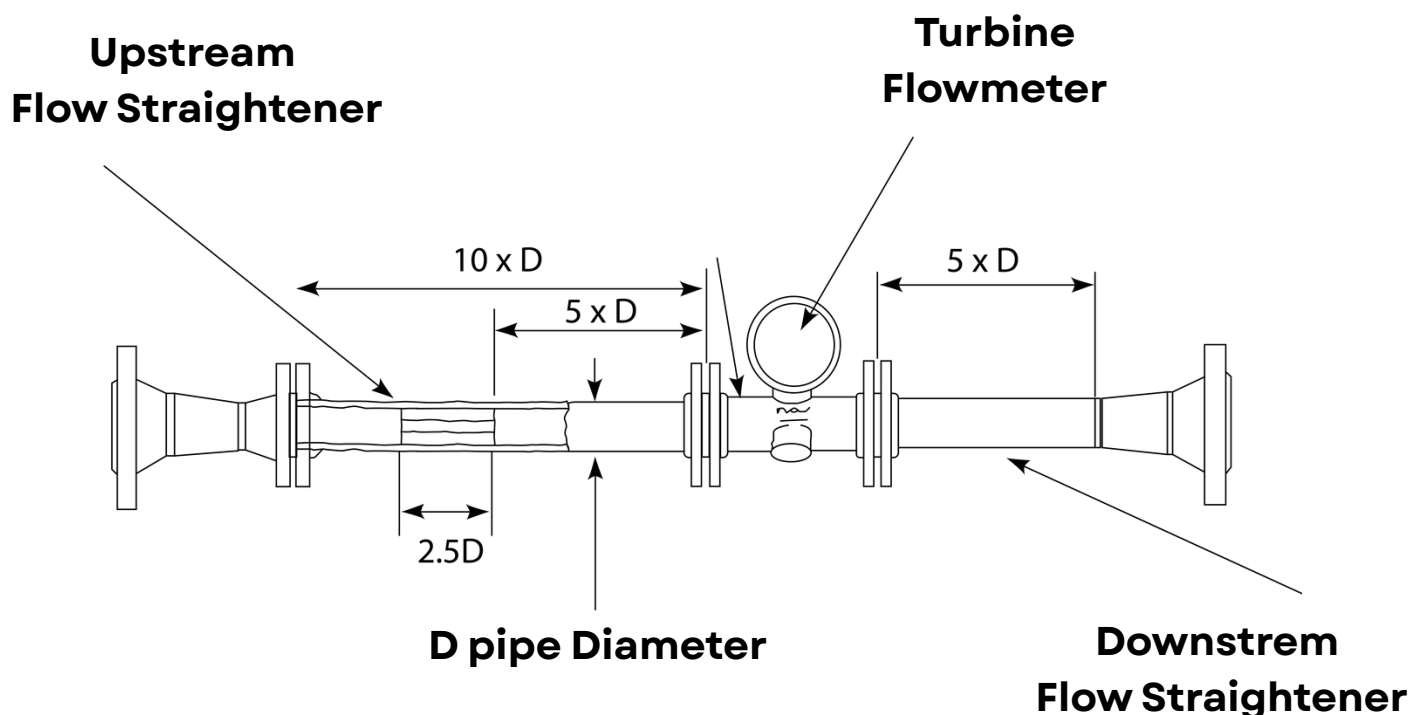
* Welded to meter body @ 180° out of phase to Pickoff sensor

OPTIMUM INSTALLATION:

The turbine flowmeter is sensitive to velocity profile changes and swirl. Also upstream/downstream valves, T-junctions, misalignments, and multiple bends can introduce a significant effect on the flowmeter output. If the flowmeter is mounted at an angle, bearing load is changed and accuracy will be affected.

An optimum installation is where a fully developed profile is attained before entry to the flowmeter. The best flow pattern is obtained by using 10× Diameter upstream and 5× Diameter downstream (refer Figure-A).

The flow through the flowmeter should always be controlled by means of a valve mounted downstream of the flowmeter.



Typical Turbine Flowmeter Installation

Figure - A

Part Numbers for Flow Straightener FA Series

MS Flared Units			MS Flared or ANSI Flanged ^⑤	
Nominal Tube Size	Upstream P/N	Downstream P/N	A	B
1/2"	FAMS-8U	FAMS-8D	5.00	2.50
5/8"	FAMS-10U	FAMS-10D	6.25	3.12
3/4"	FAMS-12U	FAMS-12D	7.50	3.75
1"	FAMS-16U	FAMS-16D	10.00	5.00
1-1/4"	FAMS-20U	FAMS-20D	12.50	6.25
1-1/2"	FAMS-24U	FAMS-24D	15.00	7.50
2"	FAMS-32U	FAMS-32D	20.00	10.00

ANSI Flanged Units

Nominal Size	Upstream				Downstream			
	150#	300#	600#	900#/1500#	150#	300#	600#	900#/1500#
1/2"	FAF1-8U	FAF2-8U	FAF3-8U	FAF4-8U	FAF1-8D	FAF2-8D	FAF3-8D	FAF4-8D
3/4"	FAF1-12U	FAF2-12U	FAF3-12U	FAF4-12U	FAF1-12D	FAF2-12D	FAF3-12D	FAF4-12D
1"	FAF1-16U	FAF2-16U	FAF3-16U	FAF4-16U	FAF1-16D	FAF2-16D	FAF3-16D	FAF4-16D
1-1/4"	FAF1-20U	FAF2-20U	FAF3-20U	FAF4-20U	FAF1-20D	FAF2-20D	FAF3-20D	FAF4-20D
1-1/2"	FAF1-24U	FAF2-24U	FAF3-24U	FAF4-24U	FAF1-24D	FAF2-24D	FAF3-24D	FAF4-24D
2"	FAF1-32U	FAF2-32U	FAF3-32U	FAF4-32U	FAF1-32D	FAF2-32D	FAF3-32D	FAF4-32D
2-1/2"	FAF1-40U	FAF2-40U	FAF3-40U	FAF4-40U	FAF1-40D	FAF2-40D	FAF3-40D	FAF4-40D
3"	FAF1-48U	FAF2-48U	FAF3-48U	FAF4-48U	FAF1-48D	FAF2-48D	FAF3-48D	FAF4-48D
4"	FAF1-64U	FAF2-64U	FAF3-64U	FAF4-64U	FAF1-64D	FAF2-64D	FAF3-64D	FAF4-64D

⑤ Refer Figure-B for dimensions

⑥ Pressure Tap options are available

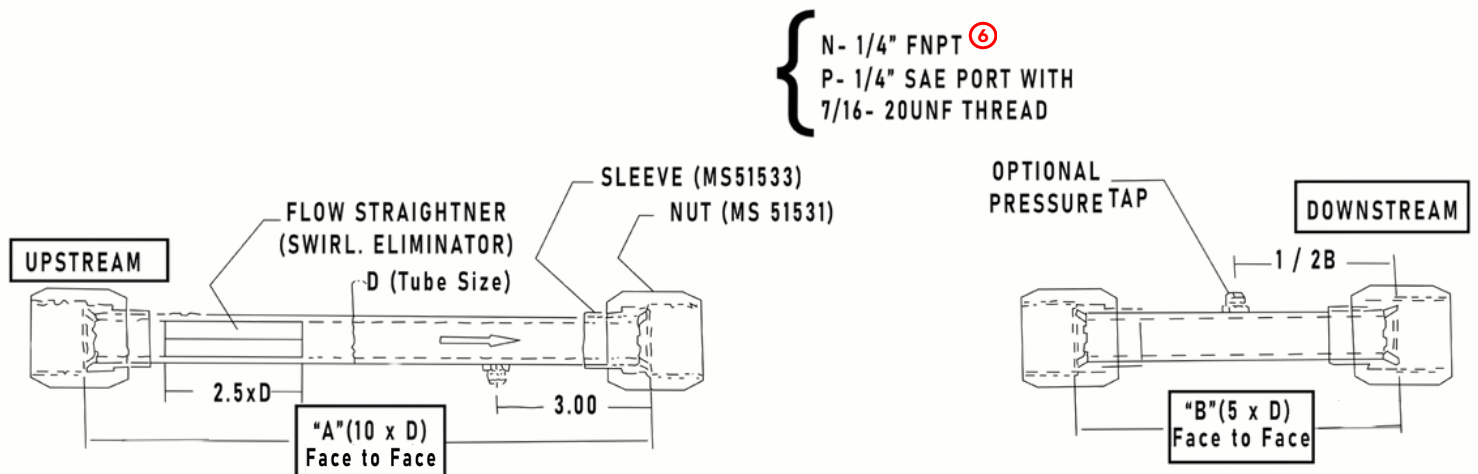
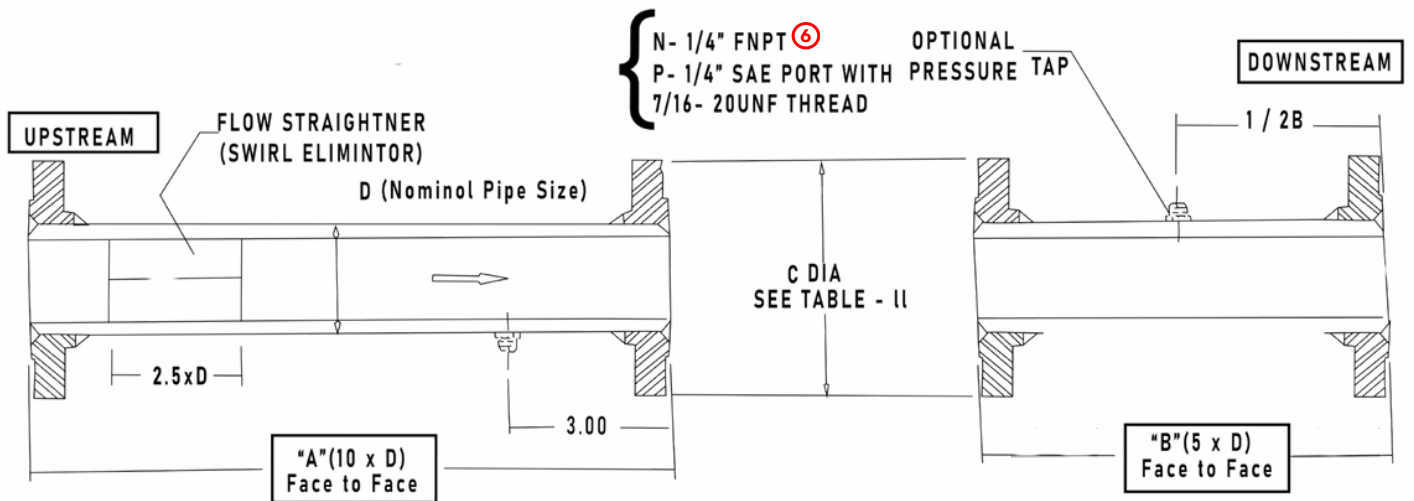
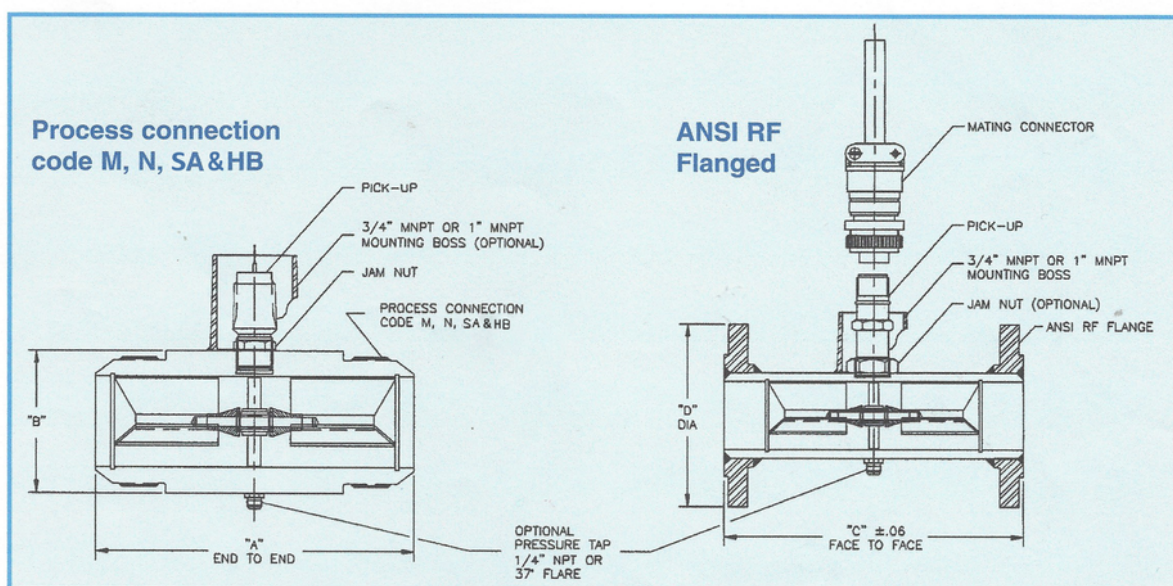
MS FLARED UNITS**ANSI RF FLANGED UNITS****Figure - B**

Table III - Dimensions:

Model Prefix	Nominal Pipe Size	A	B Hex or OD	150 #		300 #		600 #		900 #		1500 #		2500 #	
				C	D	C	D	C	D	C	D	C	D	C	D
FA-4-8 to FA-8	1/2"	2.45	1.000	5.00	3.50	5.00	3.75	5.00	3.75	5.50	4.75	Consult Factory			
FA-10 ^③	5/8", 3/4"	2.72	1.375	5.50	3.88	5.50	4.63	5.50	4.63	5.50	5.13				
FA-12	3/4"	3.25	1.375	5.50	3.88	5.50	4.63	5.50	4.63	7.00	5.13				
FA-16	1"	3.56	1.625	5.50	4.25	5.50	4.88	5.50	4.88	8.00	5.88				
FA-20	1 1/4"	4.06	1.875	6.00	4.63	6.00	5.25	6.00	5.25	8.00	6.25				
FA-24	1 1/2"	4.59	2.125	6.00	5.00	6.00	6.13	6.00	6.13	9.00	7.00				
FA-32	2"	6.06	2.750	6.50	6.00	6.50	6.50	6.50	6.50	9.00	8.50				
FA-40	2 1/2"	7.00	2.875	7.00	7.00	7.00	7.50	7.00	7.50	10.00	9.63				
FA-48	3"	10	3.500	10.00	7.50	10.00	8.25	10.00	8.25	10.00	9.50				
FA-64	4"	12	4.500	12.00	9.00	12.00	10.00	12.00	10.75	12.00	11.50				
FA-96	6"	14	6.625	14.00	11.00	14.00	12.50	14.00	14.00	14.00	15.00				
FA-128	8"	N/A		16.00	13.50	16.00	15.00	16.00	16.50	16.00	18.50				
FA-160	10"			20.00	16.00	20.00	17.50	20.00	20.00	20.00	21.50				
FA-192	12"			24.00	19.00	24.00	20.50	24.00	22.00	24.00	24.00				

**Figure - C**